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The Terrestrial Isopod Genus *Porcellio* in Western Asia (Oniscidea: Porcellionidae)

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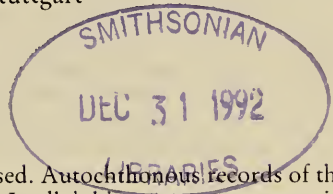
With 105 figures

Summary

The Asiatic representatives of the genus *Porcellio* are revised. Autochthonous records of the genus are known only from southwestern Asia, east to Iran. In all dubious cases type-material was examined. The following 15 taxa are recognized as valid species: *Porcellio laevis*, *P. olivieri*, *P. inconspicuus*, *P. yemenensis*, *P. barroisi*, *P. evansi*, *P. curti*, *P. obsoletus*, *P. palaestinus*, *P. ficulneus*, *P. deganiensis*, *P. chuldahensis*, *P. cilicius*, *P. pseudocilicius*, *P. insignis*. *Porcellio penicilliger* Verhoeff, 1917, *Haloporcellio abbreviatus* Verhoeff, 1933, *Haloporcellio jordani* Verhoeff, 1933 and *Porcellio assimilis* Strouhal, 1957 are considered as synonyms of *P. barroisi* Dollfus, 1892; *Porcellio frontsignatus* Verhoeff, 1943 and *Trachelipus triaculeatus* Vandel, 1980 as synonyms of *P. evansi* Omer-Cooper, 1923; *Porcellio syriacus* Brandt, 1833, *P. griseus* Brandt, 1833, *P. fissifrons* Dollfus, 1892, *P. contractus* Dollfus, 1892, *P. anatolicus* Arcangeli, 1938, *P. batayensis* Verhoeff, 1949 and *P. iskenerunus* Verhoeff & Strouhal, 1967 as synonyms of *P. obsoletus* Budde-Lund, 1885; *Porcellio kislarensis* Verhoeff, 1941 and *P. almanus* Verhoeff, 1949 as synonyms of *P. cilicius* Verhoeff, 1907. *Porcellio pseudocilicius* is described as new species. Drawings or SEM-photographs of the diagnostic characters are given for every treated species, for part of the species the records are mapped.

Zusammenfassung

Die asiatischen Vertreter der Gattung *Porcellio* werden revidiert. Autochthone Nachweise der Gattung liegen nur für das südwestliche Asien östlich bis zum Iran vor. In allen unklaren Fällen wurde Typen-Material untersucht. Die folgenden 15 Taxa werden als gültige Arten anerkannt: *Porcellio laevis*, *P. olivieri*, *P. inconspicuus*, *P. yemenensis*, *P. barroisi*, *P. evansi*, *P. curti*, *P. obsoletus*, *P. palaestinus*, *P. ficulneus*, *P. deganiensis*, *P. chuldahensis*, *P. cilicius*, *P. pseudocilicius*, *P. insignis*. *Porcellio penicilliger* Verhoeff, 1917, *Haloporcellio abbreviatus* Verhoeff, 1933 und *Porcellio assimilis* Strouhal, 1957 werden als Synonyme von *P. barroisi* Dollfus, 1892 betrachtet; *Porcellio frontsignatus* Verhoeff, 1943 und *Trachelipus triaculeatus* Vandel, 1980 als Synonyme von *P. evansi* Omer-Cooper, 1923; *Porcellio syriacus* Brandt, 1833, *P. griseus* Brandt, 1833, *P. fissifrons* Dollfus, 1892, *P. contractus* Dollfus, 1892, *P. anatolicus* Arcangeli, 1938, *P. batayensis* Verhoeff, 1949 und *P. iskenderunus* Verhoeff & Strouhal, 1967 als Synonyme von *P. obsoletus* Budde-Lund, 1885; *Porcellio kislarensis* Verhoeff, 1941 und *P. almanus* Verhoeff, 1949 als Synonyme von



P. cilicius Verhoeff, 1907. *Porcellio pseudocilicius* wird als **neue Art** beschrieben. Die diagnostischen Merkmale aller Arten werden auf Zeichnungen oder REM-Aufnahmen abgebildet, für einen Teil der Arten sind die Nachweise kartiert.

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1. Introduction

During the past 160 years a great number of nominal species of the genus *Porcellio* have been described from the Near East. The descriptions were often inappropriate, and species described formerly from the same region were frequently ignored. This led to multiple descriptions of the same species, in extreme cases up to eight times (*P. obsoletus*). For some species not a single figure was ever published, and a safe identification was often impossible, which means that all records of the species subsequent to the original description are doubtful. So when I tried to identify recently collected material from the Near East it became apparent that only by re-examination and re-description of the types this would make any sense. I investigated most available type specimens and I give sets of figures of the diagnostic characters of each species to enable future identification. Additionally all subsequent records were critically revised. With these prerequisites fulfilled I could determine numerous *Porcellio*-samples from recent and older unidentified collections that were at my disposal, coming from Turkey, Syria, Lebanon, Israel, Jordan, Iraq and Iran. Beyond these countries to the north and east the genus *Porcellio* does not occur autochthonously, as far as we know today. Thus a reasonably realistic picture of the Asiatic species of *Porcellio* can be presented.

A list of all nominal species described under the genus *Porcellio* (which formerly included other porcellionid genera) is added, if possible with ascription to a valid species viz. their present-day systematic position. In the maps only safe identifications are considered.

2. Abbreviations

<i>BML</i>	=	British Museum (Natural History) London;
<i>MCSNV</i>	=	Museo civico di Storia naturale Verona;
<i>MNHNP</i>	=	Musée National d'Histoire Naturelle Paris;
<i>SMF</i>	=	Senckenberg-Museum Frankfurt/Main;
<i>SMNS</i>	=	Staatliches Museum für Naturkunde Stuttgart (with isopod collection numbers);
<i>ZMB</i>	=	Zoologisches Museum der Humboldt-Universität Berlin;
<i>ZMK</i>	=	Zoologisk Museum København;
<i>ZSM</i>	=	Zoologische Staatssammlung München.

3. Acknowledgments

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4. The genus *Porcellio* Latreille, 1804

Type-species: *Porcellio scaber* Latreille, 1804.

The family Porcellionidae is in the recent literature commonly defined by the number and structure of the respiratory organs ("pseudotracheae" = lungs) in the pleopod-exopodites: The first and second exopodite possess deep invaginations with one tube-like entrance and a multiple branching into small tubuli inside the exopodite. They function as lungs for air-breathing. In the living animal these organs can be recognized as white patches on the pleopod-exopodites. The specific number, structure and position of these organs are a convincing synapomorphic character to prove the Porcellionidae a monophyletic taxon. The genera *Periscyphis*, *Somalodillo* and *Koweitoniscus* possess comparable unitracheal lungs in the first two pleopod-exopodites, but the morphology of the exopodites is completely different from that exhibited by the Porcellionidae, and other derived characters show them to belong to the family Eubelidae.

For the genus *Porcellio* the following characters are generally used as diagnostic inside the family Porcellionidae:

- I. Pleon-epimera enlarged to form a continuous outline with the pereon.
- II. Pereon-epimera I with concave hind-margin.
- III. Head with pronounced side-lobes.
- IV. Eyes of adults with more than 20 ommatidia.
- V. Telson with concave sides.
- VI. No conglobation ability.

The last character must be cancelled, since the species of "*Atlantidium*" from the Madeira archipelago are nothing else but conglobating species of *Porcellio* (SCHMAL-

FUSS 1989b: 21 ff.). The remaining diagnose is still not satisfactory, because it excludes e. g. *P. provincialis* (France) by character no. II, while the species is certainly closely related to other species of *Porcellio* from the same region. On the other hand the diagnose includes "*Porcellio*" *lamellatus* which is obviously a close relative of *Proporcellio quadriseriatus* and should be included in that genus. The question of monophyly of the group united in the genus *Porcellio* remains open, convincing common derived characters (synapomorphies) have yet to be worked out. The North African *laevis-hoffmannseggi*-group, defined by elongated male pleopod-exopodites, probably should be considered a separate genus (which then must be called *Rogopus* Budde-Lund, 1908). This group is presently under taxonomic revision (see SCHMALFUSS 1989a), the mentioned questions will be treated in future papers of that series.

Three of the Asiatic species belong to the *laevis-hoffmannseggi*-group (*P. laevis*, *olivieri* and probably *inconspicuus*). With *P. oliveri* this group reaches in southern Israel the easternmost part of its autochthonous distribution, where it overlaps with species of the *obsoletus*-group. The remaining 12 species treated in the present paper are members of this not very well-defined species-group which is distributed in the northeastern Mediterranean region.

5. Nominal species of *Porcellio* described from western Asia (Valid species are printed in bold type)

- abbreviatus* (Verhoeff, 1933) (*Haloporcellio a.*) = *P. barroisi* Dollfus, 1892
abaronii Verhoeff, 1917 = *Agabiformius obtusus* (Budde-Lund, 1909) (compare STROUHAL 1965: 619)
almanus Verhoeff, 1949 = *P. cilicius* Verhoeff, 1907
anatolicus Arcangeli, 1938 = *P. obsoletus* Budde-Lund, 1885
assimilis Strouhal, 1957 = *P. barroisi* Dollfus, 1892
barroisi Dollfus, 1892: chapter 6.2.2.
blattarius in OMER-COOPER 1923: identity uncertain, specimens not available
calmani Omer-Cooper, 1923 = *P. laevis* Latreille, 1804
chuldahensis Verhoeff, 1923: 6.2.9.
ciliatus Brandt, 1833 = *Leptotrichus panzeri* (Audouin, 1825)
cilicius Verhoeff, 1907: 6.2.10.
contractus Dollfus, 1892 = *P. obsoletus* Budde-Lund, 1885
curti (Vandel, 1980) (*Trachelipus c.*): 6.2.4.
deganiensis Verhoeff, 1923: 6.2.8.
evansi Omer-Cooper, 1923: 6.2.3.
extinctus Verhoeff, 1923 = *Porcellionides trifasciatus* (Dollfus, 1892)
ficulneus Budde-Lund, 1885: 6.2.7.
ficulneus var. *palaestinus* Verhoeff, 1931 = *P. palaestinus* Verhoeff, 1931
fissifrons Dollfus, 1892 = *P. obsoletus* Budde-Lund, 1885
frontsignatus Verhoeff, 1943 = *P. evansi* Omer-Cooper, 1923
griseus Brandt, 1833 = *P. obsoletus* Budde-Lund, 1885
hatayensis Verhoeff, 1949 = *P. obsoletus* Budde-Lund, 1885
inconspicuus Dollfus, 1892: 6.1.3.
insignis Brandt, 1833: 6.2.12.
iskenderunus Verhoeff & Strouhal, 1967 = *P. obsoletus* Budde-Lund, 1885
jordanis (Verhoeff, 1933) (*Haloporcellio j.*) = *P. barroisi* Dollfus, 1892
kislarensis Verhoeff, 1941 = *P. cilicius* Verhoeff, 1907
laevis Latreille, 1804: 6.1.1.
lenta in OMER-COOPER 1923 = *Agabiformius* sp.
obsoletus Budde-Lund, 1885: 6.2.5.
obsoletus ficulneus Budde-Lund, 1885 = *P. ficulneus* Budde-Lund, 1885

olivieri (Audouin, 1825) (*Oniscus o.*): 6.1.2.

palaestinus Verhoeff, 1931: 6.2.6.

penicilliger Verhoeff, 1917 = *P. barroisi* Dollfus, 1892

pruinosis Brandt, 1833 = *Porcellionides pruinosus* (Brandt, 1833)

pseudocilicium n. sp.: 6.2.11.

pulchellus Dollfus, 1892 = *Agabiforminus lentus* (Budde-Lund, 1885) 1 ♀ syntype examined (MNHNP Is. 2134), see STROUHAL 1965: 618.

punctatus Brandt, 1833: identity uncertain, specimens not available

quadriseriatus Verhoeff, 1917 = *Proporcellio quadriseriatus* Verhoeff, 1917

rufobrunneus Omer-Cooper, 1923 ≠ *Porcellio*

subterraneus Verhoeff, 1923 = *Porcellionides myrmecophilus* (Stein, 1859)

syriacus Brandt, 1833 = *P. obsoletus* Budde-Lund, 1885

tiberianus Verhoeff, 1923 = juvenile of *P. ficulneus* or *P. deganiensis*, type specimen (♂ 8 × 3.5 mm + slide preparation) examined (ZSM).

triaculeatus (Vandel, 1980) (*Trachelipus t.*) = *P. evansi* Omer-Cooper, 1923

yemenensis Barnard, 1941: 6.2.1.

6. Valid species of *Porcellio* from western Asia

6.1. The *laevis-hoffmannseggi*-group

6.1.1. *Porcellio laevis* Latreille, 1804

Porcellio laevis: BUDDE-LUND 1885: 140;
DOLLFUS 1892: 9; 1905: 163;
RICHARDSON 1926: 205;
VERHOEFF 1949: 46;
STROUHAL 1968: 351;
SCHMALFUSS 1990: 3;
TAITI & FERRARA 1991: 218.

Porcellio (Regopus) laevis: OMER-COOPER 1923: 101.

Porcellis (Rogopus) Calmani: OMER-COOPER 1923: 101, pl. IV, figs. 1–11.

Porcellio laevis biirücekensis: VERHOEFF 1941: 238.

Porcellio laevis vesaniae: VERHOEFF & STROUHAL 1967: 492.

Porcellio laevis var. *vesaniae*: STROUHAL 1968: 356, figs. 55–63;
PRETZMANN 1974: 445.

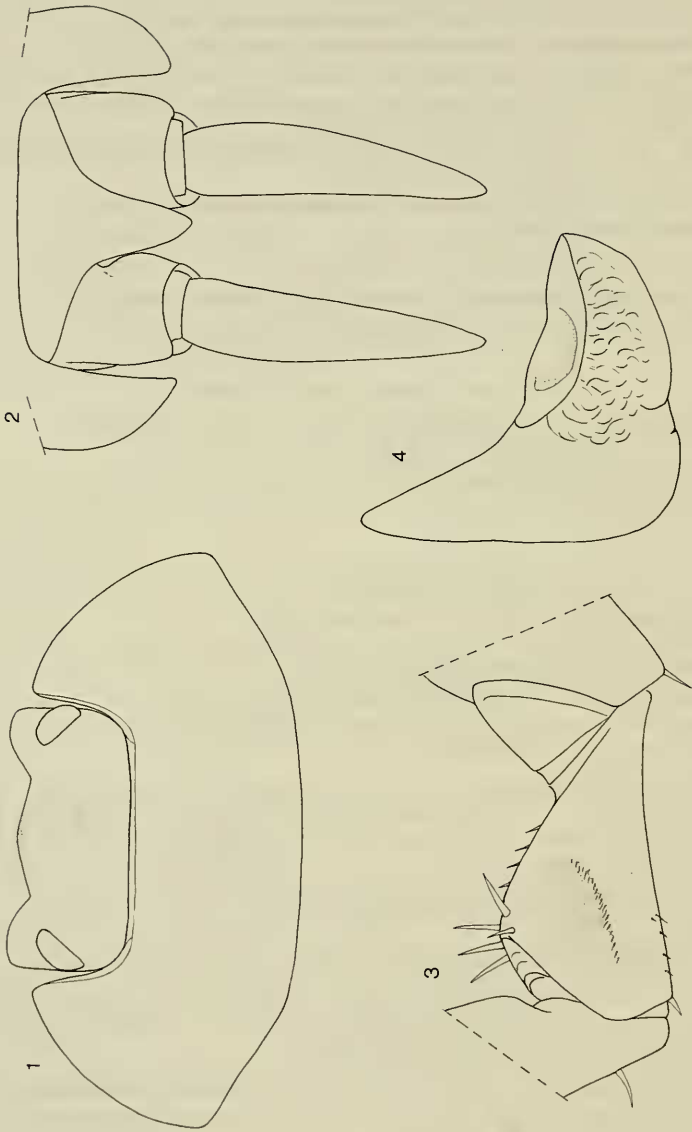
Material examined: 2 ♀♀ (syntypes of *P. calmani*), Baku (Azerbaijan), leg. BUXTON 1919 (BML 1922:5:18:4–5). — 3 specimens, Cyprus, Larnaka, leg. HESSE 1896 (SMNS 11184). — 2 ♀♀, Cyprus, Perivolía, leg. OSTEN 2. VI. 1988 (SMNS 11270). — 2 ♀♀, SW-Cyprus, Pafos, leg. GRIMM & RACHINSKY 5.–21. XII. 1988 (SMNS 11301). — 7 specimens, SE-Cyprus, Ayia Napa, leg. GRIMM & RACHINSKY 10. XII. 1988 (SMNS 11304).

Further records: Turkey (BUDDE-LUND 1885, VERHOEFF 1941, 1949, VERHOEFF & STROUHAL 1967, STROUHAL 1968). — Cyprus (DOLLFUS 1905, STROUHAL 1968). — Syria (BUDDE-LUND 1885, Dollfus 1892, RICHARDSON 1926). — Lebanon (VANDEL 1955). — Israel (PRETZMANN 1974). — Iraq (OMER-COOPER 1923). — Kuwait (TAITI & FERRARA 1991). — Ukraine: Crimea (= "Tauria") (BUDDE-LUND 1885). — Azerbaijan (OMER-COOPER 1923 as *P. calmani*). — Georgia (Caucasus) (SCHMALFUSS 1990).

Distribution: Originally probably NW-Africa, today cosmopolitan, introduced by human activities to all parts of the world. Occurs only in anthropogenous biotopes.

Dimensions: Up to 18 mm long.

Diagnostic characters: Coloration: Brownish grey, with groups of light streaks on pereon-tergites (muscle-spots) and light blotches on bases of epimera. — Cuticular structures: Tergal parts with very faint granulation. — Triangular median lobe on frontal part of head, side-lobes laterally straight (fig. 1, difference towards



Figs. 1—4. *Porcellio laevis*, ♂, 14 × 7.7 mm (Cyprus, SMNS 11304). — 1. Dorsal view of head and pereon-tergite I; — 2. Dorsal view of telson and uropods in situ; — 3. Ischium VII, frontal (ventral) face; — 4. Pleopod-exopodite I, caudal (dorsal) face.

P. inconspicuus). Hind-margin of pereon-epimera I with only a very slight sinuosity (fig. 1), in juvenile individuals not visible. Young specimens rather similar to *Leptotrichus*-species in overall appearance. Telson short with concave sides (fig. 2). — Ischium VII ♂ with a deep impression on frontal side (fig. 3). Pleopod-exopodite I ♂ with median lobe elongated backwards, surpassing genital papilla, with apex forming an acute triangle (fig. 4). Uropods (fig. 2) with slight sexual dimorphism, longer in ♂♂ than in ♀♀.

Remarks: An examination of type-specimens of *Porcellio calmani* Omer-Cooper, 1923 from Baku (Caspian Sea) proved *P. calmani* to be a synonym of *P. laevis*.

6.1.2. *Porcellio olivieri* (Audouin, 1825)

Porcellio olivieri: STROUHAL & PRETZMANN 1975: 624.

Material examined: 2 ♂♂, S-Israel, Negev, 30 km S Be'er Sheva, leg. WARBURG 19. XII. 1987 (SMNS 11393).

Further records: Israel: Negev: Mashabim; Dimona; Nahal Lavan; Sede Boqer (STROUHAL & PRETZMANN 1975). — Egypt: Sinai: 15 km NE El-Arish; Wadi Zelequ (STROUHAL & PRETZMANN 1975).

Distribution: Desert and semi-deserts from Algeria to S-Israel.

Dimensions: Maximal length 21 mm.

Diagnostic characters: Coloration: White with 4 variable dark bands on tergal parts. — Cuticular structures: Tergal parts very slightly granulated. — Head with triangular median lobe, lateral lobes twice as long as median lobe, external margin slightly bent outwards (fig. 5). Pereon-epimera I caudally only very faintly sinuate (fig. 5). Telson with distal part longer than in *P. laevis*, surpassing uropod-protopodites (fig. 6). Antennal flagellum with distal article slightly shorter than proximal one. Ischium VII ♂ (fig. 7) very similar to that of *P. laevis*. Pleopod-exopodite I ♂ with long median lobe (fig. 8) ending in a truncate and sinuate apex.

Remarks: *P. olivieri* differs from *P. laevis* by its specific coloration, longer side-lobes of head, longer telson and truncate pleopod-exopodite I ♂. For a list of synonymies referring to the north African populations and a discussion of taxonomic questions see STROUHAL & PRETZMANN 1975.

6.1.3. *Porcellio inconspicuus* Dollfus, 1892

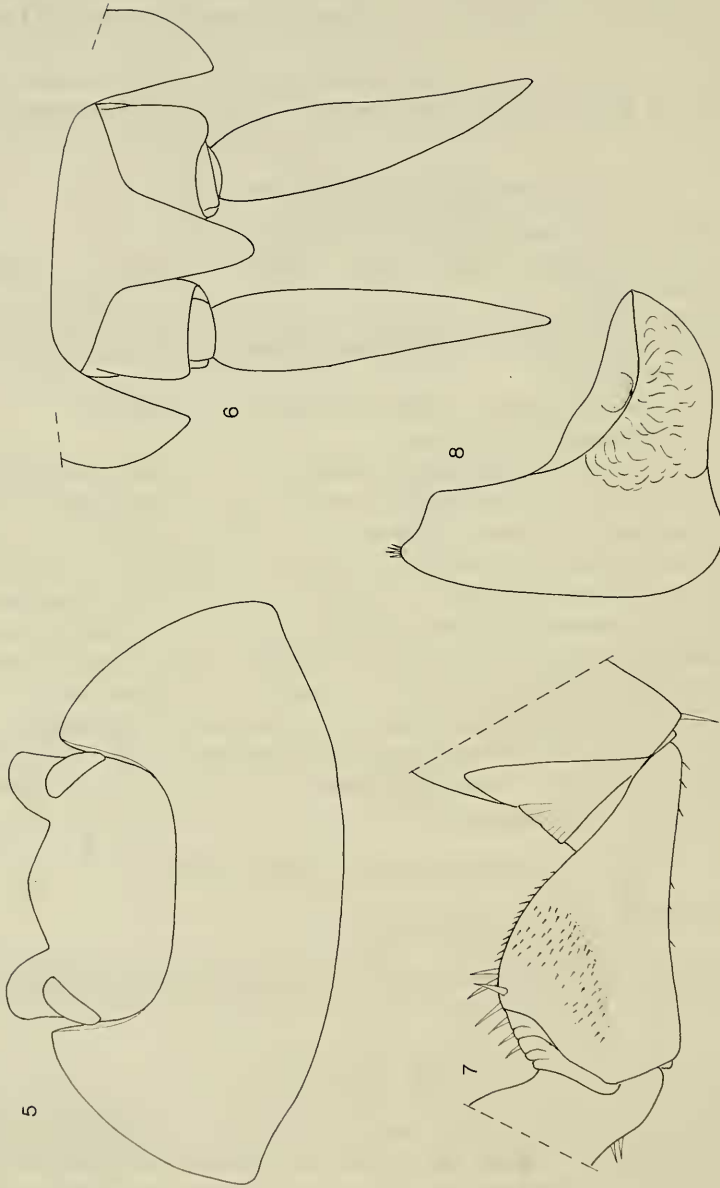
Porcellio inconspicuus: DOLLFUS 1892: 5, figs. 4A–4C;
VERHOEFF 1923: 218.

Material examined: 1 ♀ with marsupium (11 × 4.8 mm, holotype), "Quadys de la Mer Morte" (so in today's Jordan or Israel), leg. BARROIS 1890 (MNHN Is. 2132, DOLLFUS 1892).

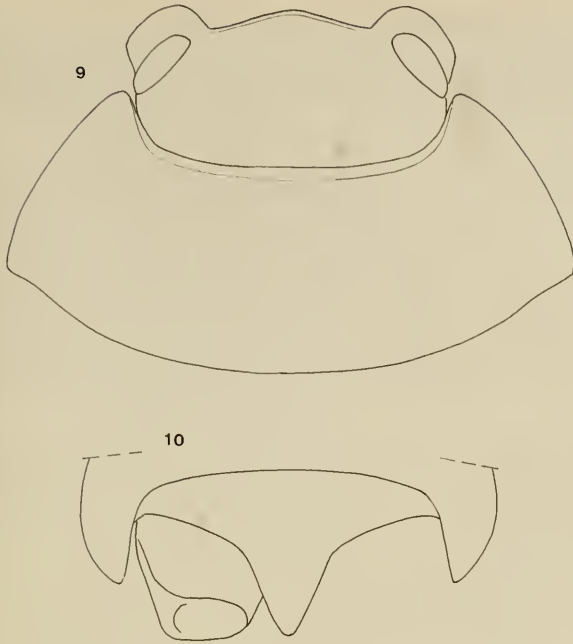
Distribution: Known only from the type locality (5 ♀♀).

Diagnostic characters: Coloration: Greyish brown with many light spots, epimera whitish (color possibly faded by long conservation). — Cuticular structures: Tergites with flat granules. — Head with median lobe rounded, reaching as far as the short side-lobes (fig. 9). Telson see fig. 10. Antennal flagellum with articles of the same length.

Remarks: The species is very similar to *P. laevis*, but the side-lobes of the head show distinctive differences which seem to indicate that it is a separate species. Since only ♀♀ are known it is impossible to ascribe *P. inconspicuus* with certainty to one of the two groups of *Porcellio* treated in this paper.



Figs. 5–8. *Porcellio olivieri*, ♂, 17 × 9 mm (Israel, Negev, SMNS 11393). — 5. Head and pereon-tergite I; — 6. Telson and uropods in situ; — 7. Ischium VII, caudal face; — 8. Pleopod-exopodite I, frontal face.



Figs. 9–10. *Porcellio inconspicuus*, holotype, ♀, 11 × 4.8 mm. — 9. Head and pereon-tergite I; — 10. Telson.

6.2. The *obsoletus*-group

6.2.1. *Porcellio yemenensis* Barnard, 1941

Porcellio yemenensis: BARNARD 1941: 57, fig. 1;
 FERRARA & TAITI 1985: 95, figs. 3a–3j;
 TAITI & FERRARA 1989: 79.

Material examined: 1 ♂, 1 ♀, W-Yemen, 26 km WNW Sa'ah, Wadi Maqsala, 2000 m (17°05' N, 43°32' E), leg. LANZA, BORRI & POGGESI XI. 1979 (SMNS 15255, FERRARA & TAITI 1985).

Distribution: Known from western part of Yemen and from the surroundings of Jiddah in Saudi Arabia. For exact localities and a distribution map see FERRARA & TAITI (1985), additional records from around Jiddah see TAITI & FERRARA (1989).

Dimensions: 12 × 5.5 mm.

Diagnostic characters: Coloration: Yellowish with dark pigmentation in five rows, yellow line on base of epimera, margins of epimera without pigmentation. Noduli laterales marked by yellow spots. — Cuticular structures: Tergites slightly granulated. — Head with weakly developed rounded median protrusion without incision, side-lobes varying, of small to moderate size (compared with other species of the genus) (fig. 11, see also figs. 3a and 3b in FERRARA & TAITI 1985). Pereon-tergite I with only slight sinuosity on hind-margin (fig. 11). Telson triangular with pointed apex and concave sides, not surpassing uropod-protopodites (fig. 12). Ischium VII ♂ ventrally sinuate (fig. 13). Pleopod-exopodite I ♂ with slightly protruding hind-lobe, length-width-ratio about 1 : 1.5 (fig. 14). Pleopod-endopodite I ♂ with apex rounded and equipped with a series of small spines (fig. 15). Uropod-exopodite in ♂ (fig. 12) about twice as long as telson, in ♀ slightly shorter.